School Audit Manual

DISCLAIMER

The authors of this audit and user manual assume no responsibility for any damages that occur as a result of the audit use. While the authors have taken due care to ensure that the material and instructions presented within would not endanger the user of the audit or produce negative consequences for pedestrians in general, the authors will not be held liable for damages of any kind resulting from correct or incorrect use of the materials. While the materials are as comprehensive as possible, users of the audit and agencies that sponsor them need to understand that there are certainly many other aspects of safety that are not fully addressed by these materials.

INTRODUCTION

The purpose of the school audit form is to enable its users to systematically and comprehensively observe walking conditions to, from, and at schools. The focus of the audit is not to perform an inventory of pedestrian facilities or to classify the "walkability" of an area, but to identify existing or potential safety concerns for pedestrians. After completing the school audit, you will be able to recognize and understand a variety of potential problems that could reduce pedestrian safety, identify where these problems occur, and establish any patterns in their location. This will enable you to better plan a response to help improve the safety for children walking to school. This manual will assist you in 1) preparing to audit a location; 2) conducting the school audit; and 3) interpreting and using results.

PLANNING AND PREPARING FOR THE DATA COLLECTION EFFORT

The following seven steps will help you plan and prepare for your data collection effort in which you will use the school audit form.

Step 1: Gather necessary data to identify locations to audit. Some areas to audit may already be known and planned by your agency, or easily identified based on crash events, historical problems, or feedback and requests from parents, school officials, or others. Other audits may be part of a systematic effort to cover large areas of a jurisdiction, such as an entire school district, or all the elementary schools in a town. Many schools are already part of Safe Routes to School (SR2S) program or other formal program; these may have already included efforts to map principle routes to school and identify major problems along the way. There will likely be a coordinator for these activities who is familiar with pedestrian issues around the school; this person may be a good source of information for identifying locations to audit. It is recommended to locate these areas on a map in order to assist with the overall coordination of the audit application and to identify the most efficient ways to collect the necessary data.

Step 2: Identify and define the study area/unit of measurement for audit. The two school audit forms provide questions to assess three basic parts of the school walking environment. The first audit form covers the *school campus*—including the overall campus but focusing specifically on the pedestrian routes from the adjacent roads/paths and pick-up/drop-off zones to the school buildings. This form will be filled out once for each school area audited.

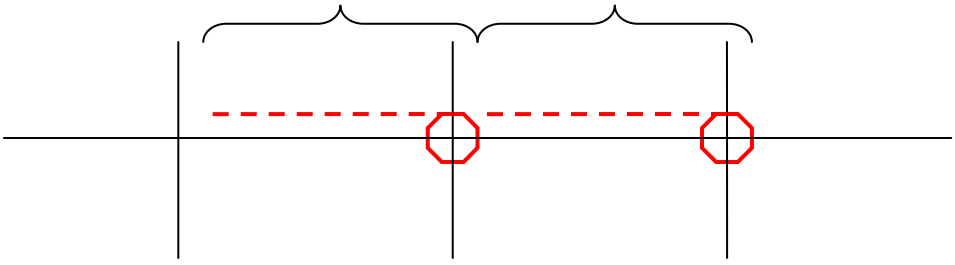
The second form covers the *school zone*: Many schools define their school zone based on their student catchment area or bus zone policy. If the school zone is not defined, a good rule of thumb is to consider the street network in a 1-mile radius of the school as the school zone. Map the school zone before going to the field to know what segments you will need to include in the audit. The *school zone* form covers two components of the walking environment beyond the school campus:

1) C*rossings*—where there is a possibility that children may be crossing the street. Crossings may or may not be at roadway intersections, although for the purposes of this audit midblock crossings should only be considered crossings when marked by a crosswalk. A crossing may or may not be staffed with a crossing guard.

2) S*egments*—defined as two sides of a roadway along which there is a possibility that children may be walking. A segment begins at a crossing and continues up to, but does not include, the next intersection (see Figure 1).

The *school zone* audit form should be duplicated and a separate form filled out for each crossing/segment pair. In the schematic below, each bracketed pair would be audited using a separate *school zone* form.

Figure 1: Schematic of Crossing/Segment Pair



In advance of performing the audit, develop a procedure to link the audit locations identified in Step 1 to the audit sheet that will be used in the field to collect the data. For example, establish a unique identifying number for each crossing/segment on a map of all locations to be audited; write this identifying number in the space provided at the top of the audit form when you first begin to link the data to the location where it was collected. Don't label the audit forms in advance—it is easier to get the forms confused and lose the link between the data and where it came from.

Step 3: Consider the element of time. The time factor is important for both 1) identifying the best time to conduct the audit, and 2) knowing how long the audit will take. For school audits, it is important to time the audit to capture the peak period activities when children are walking and biking to or from school (and when drivers are picking up and dropping off students). Student arrival and dismissal times can often be found on the school's web site or by contacting the school directly. Ideally, auditors would be able to visit a site at different times (e.g., both morning and afternoon) to observe the bicyclist and pedestrian safety conditions in a variety of social and environmental settings. Also, if there is a known safety problem or if previous crashes and conflicts have been documented, it is best to try to audit the area at a time similar to when the conflicts are known to occur (e.g., when it's dark or when drivers are running stop signs to get their kids to

school in the morning, etc.). If your resources permit only a one-time audit, it is probably best to perform the audit during the afternoon dismissal time. More students tend to walk in the afternoon than in the morning, and student/pedestrian activity in the afternoon tends to take place in a more compressed time frame than in the morning.

To audit a crossing/segment and the school site using these school audit forms will take approximately 30 minutes, depending on the length of the segment, the size of the campus, and the experience of the auditor with the area being observed and the audit and manual content. This does not include the time necessary to plan the audit and travel to the site. The section of the audit dealing with the school site takes approximately 10 minutes, the section on segments takes about 10 minutes per segment, and the section on crossings takes about 10 minutes. It is recommended that the auditors begin with the School Site form and begin the audit at the time when students are first coming to/leaving school (when there is the most activity on campus). From there, the auditors can walk out to the nearest crossings abutting the school and begin filling out the second form.

Step 4: Determine your staffing needs. Once you've identified the areas you will need to audit and the time it will take to collect the data, you can determine the amount of staff needed to complete the task. It is recommended that at least a pairs of auditors be used to audit every site together—having two people observing one site helps 1) ensure that more of the problem conditions are identified, 2) speed up the audit process more than if one person were working alone, and 3) provide added safety and security for the auditors in the field. Depending on the size of the campus and the layout of the pick-up/drop-off zones for parents and buses, several auditors may need to be positioned in various places to observe the activities; otherwise, one person will have to make several trips to be able to capture all that is taking place in these areas.

Step 5: Identify and coordinate with appropriate stakeholders. Since the audit requires its users to go on school property to observe walking and biking conditions on the campus (e.g., at pick-up/drop-off zones, etc.), the auditors will need to get in touch with school officials in advance to alert them of the site visit or to get a visitor pass. Most schools have contact information available online; auditors should email or call the assistant principal (or other school official) to quickly explain the reason for your visit and provide information on when you will be on campus. The SR2S coordinator (mentioned in Step 1) may also be a good person to inform of your efforts. When on campus, you may be approached by concerned or curious staff, parents, or students, so have a plan on what information to provide these various groups. In addition to school-related stakeholders, it may be helpful to coordinate with other agencies or groups you identify—such as the public works or traffic department in your city—in order to find out what other plans are underway for the areas you will be auditing and if there is any opportunity to collaborate and share the data collected.

Step 6: Train the auditors. The individuals using this school audit form will need to be very familiar with the audit and this manual before performing their official audits. The manual is a critical instrument in helping the auditor to understand the questions asked in the audit and decide the most appropriate response. Depending on the agency and the level of experience of the auditor with the given audit form, various levels of training may be required. Some agencies require a one or two day training course to thoroughly go over the manual and the audit as well as try it out in the field. The more training that is provided up front, the more accurate auditors will be in recording conditions and the quicker they will be able to move through the auditing process.

On top of understanding the audit form and the material it contains, auditors need to be trained to be aware of any safety and security concerns while they're in the field performing the audit (e.g., watch for cars/people, obey traffic laws, etc). Some agencies require their staff to wear safety vests, hats, boots, etc., when they're collecting field data; individuals required to wear high-visibility clothing should note in their final reports if there was a possibility that this had an effect on driver or pedestrian behavior observed during the audit.

Step 7: Gather materials and supplies. These may include maps, this manual, audits (on paper or coded in Palmtop), pen/pencil, clipboards, personal identification, water, sunscreen, safety vests (if required by your agency), a camera, and important contact information for when you're in the field.

GLOSSARY

Crossing—Crossings may or may not be at roadway intersections, although for the purposes of this audit, midblock, or non-intersection, crossings should only be considered crossings when marked by a crosswalk. A crossing may or may not be staffed with a crossing guard. Locations where it is obvious that pedestrians are crossing regularly but there are no markings or curb cuts and ramps, should be considered informal crossings.

Major/Arterial Street—Most jurisdictions classify streets according to traffic speeds, volumes and roadway width and capacity (e.g. number of lanes). In urban areas, major streets or arterials usually have two lanes or more in each direction and carry substantial numbers of vehicles, especially during peak travel times. In rural areas, a major street may have only one lane in each direction, but is an important connection in the road network and thus carries a large share of traffic.

Pedestrian signal—A signal, sometimes accompanied by an electronic chirp that identifies when it is appropriate for pedestrians to cross an intersection. Pedestrian signals generally show "Walk" or a picture of a person walking in white or green when it is appropriate to cross and "Don't Walk" or a picture of a hand in red when it is not safe.

CONDUCTING THE AUDIT

The following sections of the manual coordinate precisely to the questions in the audit forms. They are intended to provide guidance in filling out the forms and in responding to the questions presented. Throughout the audit, there is space provided to note any safety concerns not specifically mentioned in the audit. Auditors should always feel free to note such concerns.

Top of Sheet Data

At the top of the audit form, fill in the blanks for segment number (see Step 2 in the previous section of this manual), name(s) of auditor(s), the date, time, grade level (e.g., K-8, K-12, Elementary, Middle/Junior High, High School, or other), and weather. You should know the grade level of the school to be audited—in advance of going into the field—through the completion of the planning/preparation steps outlined above.

School Campus Form

Bus Loading/Unloading Zones

1. Are bus driveways separated from student/pedestrian routes?

Children are often too small to be seen clearly by bus drivers when walking in front of or behind a bus. Having buses separated from pedestrian routes is important because it reduces the possibility of conflict between children and buses. Photo 1 shows an uncontrolled student/pedestrian route through a bus driveway that can create a safety problem. Because children often have a lot of energy, behave erratically, and don't consider the safety of their surroundings, schools should minimize the possibility of children walking around and between buses or supervise the area closely. Consider both formal, marked pedestrian routes or any informal routes that students/pedestrians take across bus driveways.

1. Uncontrolled/unsupervised children in a bus driveway.

Photo by: A. Hartell

2. If buses are double stacked, are appropriate safety measures taken?

When buses are double-stacked in bus driveways, visibility of students/pedestrians is even further reduced. In such situations, appropriate safety measures include well-marked pedestrian routes, trained supervision and/or traffic controllers, or bus parking policies (e.g., pull up to bus in front within 1 ft) to discourage pedestrians from being able to cut between buses.

3. Is the bus loading zone separated from parent drop off and pick up zones?

Having the bus loading zone separate from parent drop off and pick up areas prevents children from having to negotiate through buses on their way from being dropped off to the school building (or from buses through car lines to the school), and it reduces the amount of visual chaos that bus and vehicle drivers encounter. If the answer to this question is "no", then skip to question number 6 on this form. If the answer is "yes" then continue to the next question.

4. Is loading zone lighted?

Lighting conditions are difficult to assess during a daytime audit. If lighting is a significant concern, you may wish to schedule an evening or early morning field visit. School children may find themselves walking to or from school in the dark, depending on the time of year and latitude. If scheduling a visit outside daylight hours is not feasible, auditors can assess whether the street lights (or exterior lights from businesses and homes) are adequate to ensure visibility. Generally, street lights every 50 ft are adequate, although auditors should consider whether street trees or buildings reduce the amount of light that actually reaches the walking surface.

5. Are there appropriate pavement markings or stand-back lines?

Pavement markings and stand-back lines can help children to know where to stand and keep them separated from bus traffic. Photo 5 shows a stand-back line at a bus zone.

5. Good example of stand-back line at bus loading zone

Photo by: A. Hartell

Student Drop Off/Loading Areas

6. Is the parent drop off and pick up zone separated from student/pedestrian routes?

Children are often too small to be seen clearly by drivers when walking in front of or behind a car or SUV. Separating pedestrian routes from traffic is important because it reduces the possibility of conflict between children and automobiles. Photo 6 shows an example where a student safety patrol member and an adult supervisor monitor a pedestrian crossing that goes through the vehicle queue. If you note that pedestrian routes are not separate from vehicle traffic, whether they are formal or informal, note any problems you see (e.g. children running in between cars, etc) in the comment box and consider any possible ways to improve the safety of pedestrians in these areas.

Photo 6. Example of safety patrol/teacher staff monitoring pedestrian route through pick-up zone

Photo by: A. Hartell

7. Is the area designed so students/pedestrians entering/exiting cars are protected from other cars?

Ideally, children should not have to cross lanes of traffic in the pick up/drop off zone to get to their destination. Photo 7 shows a good example of children being kept on the curb and protected from having to walk in front of or behind other vehicles in order to get to their car. If students must navigate past a lane or more of traffic, note if any problems exist or if additional supervision is needed.

Photo 7. Good example of students separated from vehicle line

Photo by: A. Hartell

8. Do students/pedestrians cross lanes safely in the drop off area rather than running between cars?

Children darting/dashing between cars can produce a real safety hazard. Observe student/pedestrian behavior and note any problems you see.

9. Are there appropriate vehicular signs?

Posted signs telling parents, school staff, and visitors where to go can aid in encouraging proper driver behavior (e.g., driving slowly, parking in appropriate places, etc.) and reducing confusion and driver distraction as they work to figure out where to go to park or pick up/drop off students. Posted signs can include wayfinding signs for pick up/drop off zones (e.g., a Kiss N' Go lane),

speed limits, advance warning signs, or parking regulations. Note any need for additional signs or if signs are poorly located.

9a and 9b. Posted signs aid drivers in wayfinding and can reduce confusion at the school site

Photo by: A. Hartell

Photo by: Michael Ronkin

10. Is loading zone lighted?

Lighting conditions are difficult to assess during a daytime audit. If lighting is a significant concern, you may wish to schedule an evening or early morning field visit. School children may find themselves walking to or from school in the dark, depending on the time of year and latitude. If scheduling a visit outside daylight hours is not feasible, auditors can assess whether the street lights (or exterior lights from businesses and homes) are adequate to ensure visibility. Generally, street lights every 50 ft (roughly the length of one full-size school bus) are adequate, although auditors should consider whether street trees or buildings reduce the amount of light that actually reaches the walking surface.

11. Are there appropriate pavement markings or stand back lines?

Pavement markings and stand-back lines can help children to know where to stand and keep them separated from vehicle traffic. Photo 11 shows a stand-back line at a parent pick up/drop off zone. Cones on top of the stand back lines provide additional guidance on where safety patrol students can stand and vehicles in the queue can stop to park. Note if any of these conditions exist or are necessary.

11. Example of stand-back lines

Photo by: A. Hartell

When you finish filling out the form, write the time at the bottom in the space provided. Then move to the nearest school crossing adjacent to the school campus and begin completing the *school zone* form.

School Zone Form

Crossings

1. If the crossing is at an intersection, what traffic control is present?

For the crossing, choose the one type of device that controls the flow of traffic: no control (no signs or signals), 2-way stop, 3-way stop, 4-way stop, 2-way signalized (traffic on one road has a signal), 4-way signalized (both roads have signal), or yield signs. Others could include blinking red or yellow lights or "T" intersections where only one road is stop-controlled. Flashing yellow beacons on signs or overhead are not considered traffic control signals. If the crossing is not at an intersection, mark "N/A".

2. If the crossing is not at an intersection, is it a formal pedestrian crossing (e.g., marked midblock crosswalk)?

A formal pedestrian crossing is a legal crossing where pedestrians are expected, and often encouraged, to cross. Formal crossings at midblock locations (see Photo 2)—perpendicular to the face of a block where there are no intersecting roads—must be marked with a crosswalk, and may have curb cuts, ramps or signage indicating the crossing as well. Informal crossings are found at locations where it is obvious that pedestrians are crossing regularly but there are no markings or curb cuts/ramps. If you see any informal crossings in the duration of this audit, describe them in a comment box. Mark "N/A' if this crossing is at an intersection.

2. Marked midblock crossing with crosswalk and crossing island

Photo by: Michael Ronkin

3. What pedestrian facilities are available at the crossing?

Note the type of facilities that aid pedestrians in crossing the road. These may include marked crosswalks (of various designs) and pedestrian signals (WALK/DON'T WALK; Walking man symbol/Hand symbol) as in Photo 3a, pedestrian countdown signals as in Photo 3b, or others. Other facilities could include, but are not limited to, pedestrian flags, flashing beacons, advance crossing signs, crossing signs overhead or beside the crossing (see 3c), crossing islands (see 3c), in-pavement flashing lights, raised crosswalks, etc. Crossing guards are not considered in this section, but are addressed later.

Photo 3a. Pedestrian signal

Photo by: Michael Ronkin

Photo 3b. Countdown pedestrian signal

Photo by: Michael Ronkin

Photo 3c.Overhead signage and crossing island

Photo by: Michael Ronkin

4. **Are the crossing facilities adequate for the student/pedestrian volume and traffic conditions?**

There are many signs that will help you to know if the crossing facilities are adequate for the conditions. For signalized intersections, if the road is wide and there is a lot of traffic, there should be pedestrian signals and not just traffic signals to help pedestrians cross. Other questions to ask yourself that will help you answer this question include: Would I feel comfortable making this crossing? Do vehicles stop for me? Is the crossing too wide to cross easily? Are there more pedestrians than can fit in the crosswalk? Do drivers recognize that a pedestrian crossing is here? If you answer no to these or similar questions, note what the specific issues are.

5. Is the crossing marked as a school crossing?

To increase the awareness of drivers of the potential for pedestrians to be present, crossings should be marked with appropriate signs and/or pavement markings to indicate a student crossing. Some examples of school crossing markings are provided in Photos 5a through 5c.

5a. Pavement markings

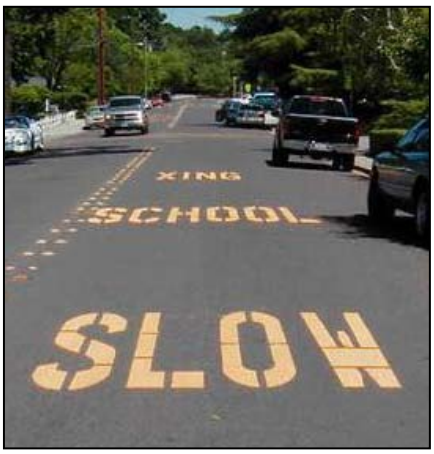


Photo by: Michael Ronkin

5b. Florescent crossing sign

Photo by: Michael Ronkin

5c. Standard crossing sign

Photo by: Michael Ronkin

6. Is the lighting adequate at the crossing?

Lighting conditions are difficult to assess during a daytime audit. If lighting is a significant concern, you may wish to schedule an evening or early morning field visit. School children may find themselves walking to or from school in the dark, depending on the time of year and latitude. If scheduling a visit outside daylight hours is not feasible, auditors can assess whether the street lights (or exterior lights from businesses and homes) are adequate to ensure visibility. Generally, street lights every 50 ft are adequate, although auditors should consider whether street trees or buildings reduce the amount of light that actually reaches the walking surface.

7. Are there sidewalks, waiting areas, and curb ramps at all legs of the intersection/crossing?

Sidewalks with adequate waiting areas to hold all pedestrians at the peak time of use are important to keep children and parents from having to stand in the street with traffic when waiting to cross. Ramps are also necessary to increase the safety and accessibility of sidewalk and crossing facilities for children, pedestrians with disabilities, and adults with strollers. If sidewalks, waiting areas, and

curb ramps are missing at any leg of the intersection, note which corners did not have facilities. Photo 7 shows a good example of a sidewalk with an appropriate waiting area and curb ramp. Photo 10 shows an example of an intersection leg without an adequate waiting area for the leg entering from the left of the photo.

7. Good example of waiting area and facilities at crossing

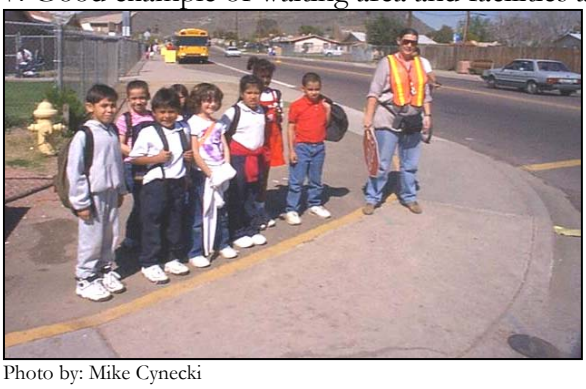


Photo by: Mike Cynecki

8. Are students/pedestrians walking in the crosswalks and obeying signals?

As you observe the crossing, note any erratic or potentially unsafe walking conditions such as children (and/or parents or other pedestrians in the area) disregarding the signal, walking outside the crosswalk, running into traffic, etc. Write your observations in the comment box. If this crossing has no signal or markings, mark "N/A". If you do not observe any pedestrians crossing, make a note of that in the space for comments.

9. Are students/pedestrians looking both ways before crossing?

Observe the looking behavior at the crossing and note if pedestrians are scanning for traffic in either direction before crossing. If not, there may be a need for pedestrian safety education programs or other engineering approaches to encourage proper looking behavior (e.g., such as railing/fencing to direct pedestrians to look upstream before crossing, etc.). If you do not observe any pedestrians crossing, make a note of that in the space for comments.

10. Do students/pedestrians have a clear view of approaching vehicles at all legs of the intersection/crossing?

Walk around each leg of the intersection and consider the perspective of a child pedestrian (possibly low to the ground). Note if there are any obstacles (such as signs, landscaping/shrubbery, parked cars, fences, etc) that could potentially restrict pedestrians from being able to see oncoming traffic. If there is not a clear view from each corner, note which corners had visibility concerns and the cause of the problem. Photo 10 shows an example of a corner with a limited view of traffic by pedestrians.

10. At this corner, pedestrians almost have to enter the road to see vehicles coming from the left

Photo by: A. Hartell

11. Do drivers have a clear view of students/pedestrians from all approaches of the intersection/crossing?

Walk around each leg of the intersection and consider the perspective of a driver approaching the intersection. Note if there are any obstacles (such as signs, landscaping/shrubbery, parked cars, fences, etc) that could potentially restrict drivers from being able to see pedestrians at or near the intersection. If there is not a clear view from each intersection approach, note which legs had visibility concerns and the potential cause of the problem.

12. Do drivers routinely yield to students/pedestrians?

As you observe the crossing, note the number of drivers yielding or not yielding to pedestrians waiting to cross on the side of the street or standing in the crossing. If there is a significant proportion not yielding to pedestrians, there may be a need for added traffic enforcement at that area or additional pedestrian crossing facilities (e.g., crossing guard, advance warning signs, signals, etc.).

13. Do drivers look for and yield to students/pedestrians when making left and right turns?

One potential conflict lies in traffic turning into the crossing while pedestrians are trying to cross the road. Often, pedestrians have the walk signal at the same time that vehicles have a green light to turn left or right, so auditors must carefully observe this situation and note if there is a potential safety concern. If you do not observe any turns, make a note of that in the space for comments.

14. Do drivers observe traffic signals? (i.e. no red light running, speeding up to make signals, or rolling stops at stop signs, etc.)

Observe the crossing to note if there are any potentially unsafe driver behaviors such as running red lights, speeding up to make yellow lights, pulling up into the crosswalk or blocking the pedestrian path, or rolling through stop signs without actually stopping. Mark "N/A" only if the crossing has no traffic control device as defined for Question 1.

Crossing Guards and Safety Patrols

15. Is there an official crossing guard on duty?

Note if there is an official crossing guard on duty. Child safety patrol members do not count as official crossing guards. The guard must be an adult wearing the proper attire, including a safety vest. Different municipalities may require additional attire (e.g., gloves, hat, whistle, etc.). Photo 15 shows an official crossing guard escorting children across a street.

15. Crossing guard escorting children across the street

Photo by: A. Hartell

15a. If 15 is yes, are students obeying crossing guards?

If you answered "yes" to question 15, then answer this question. Note if children run out in front of crossing guard or walk along with them. Note if they run or walk outside of the crossing or fail to wait for the crossing guard to completely stop traffic before they step into the street.

15b. If 15 is yes, do the crossing guards communicate effectively with students (e.g., same language)?

If you answered "yes" to question 15, then answer this question. Note if you observe any language difficulties between crossing guards and students, such as speaking a different language or children not seeming to understand the guard's instructions.

16. Is there a major/arterial street at this intersection?

If one of the streets at this intersection is a major/arterial street (see glossary for definition), then check the "yes" box and continue to the next section. If the answer is "no", then skip to Question 19.

Crossing at Major/Arterial Streets

17. Are pedestrian signals timed so that wait times and crossing times are reasonable?

Pedestrian signals (see glossary for definition) should be timed such that pedestrian wait time is minimized (preferably less than a minute) and that students of all ages and abilities are not caught in the crosswalk when the light changes. If wait times are too long, many pedestrians will choose to walk before their turn and may face safety challenges. Time the entire phase to note how long the pedestrian wait is between cycles. Also note if any pedestrians don't wait for the signal to indicate

their turn to cross. Observe the crossing and note if there is any pedestrian still in the crossing when the pedestrian signal shows a solid hand symbol or DO NOT WALK sign or if the traffic signal turns green for traffic perpendicular to the crossing. Did you notice any pedestrians having to run to get across the street before the signal changed? These behaviors may indicate a need to reconsider signal timing for pedestrians. Mark "N/A" if there are no pedestrian signals present.

18. Is there a raised median that provides a safe waiting area for pedestrians?

A raised median or crossing island can provide a safe waiting place for pedestrians to cross a street in two phases. This helps reduce the complexity of the intersection and the exposure to traffic. Note if there is a raised median in the roadway, if it is accessible to all pedestrians (e.g., has curb cuts and appropriate widths for wheel chair users), and is large enough to handle the necessary pedestrian volumes. Photo 18 provides an example of a well-designed crossing island.

18. Example of crossing island

Photo by: Michael Ronkin

Street Segment

19. Are there sidewalks?

A sidewalk is a hard-surfaced, linear facility for pedestrians that is aligned with a roadway. Only check yes if the path has a manmade, hard surface (concrete, brick pavers, asphalt, etc). If there is an informal footpath or a gravel pathway, check "no".

20. If no sidewalk is present, is there a walkable shoulder on the road?

Segments without formal sidewalks can adequately accommodate pedestrians if there is sufficient space outside the vehicle lanes. Walkable shoulders can be paved or unpaved and are often found along rural roads. A "walkable" shoulder should be a paved surface at least 1.8 m (6 ft) wide or more; 1.2 m (4 ft) is considered the minimum acceptable width to accommodate pedestrians (AASHTO Green book, 2001). Photo 20a shows a walkable shoulder, although the safety of this shoulder, especially for children, is questionable if heavy vehicle or truck traffic uses the route. Photo 20b shows an unpaved walkable shoulder. This shoulder offers more space for pedestrians and better accommodates groups of children. While this condition would probably not be considered adequate if coupled with fast and high-volume traffic conditions

present in the photo would not pose a threat. If you answer "yes" to this question, skip to #24. Mark "N/A" if sidewalks are present.

20a.Walkable shoulder in rural area

Photo by: Michael Ronkin

20b. Unpaved walkable shoulder

Photo by: www.iwalktoschool.org

21. Is this segment a trail to the school?

Trails can be important linkages between neighborhoods and schools. This question and Question 21a offer auditors the opportunity to note generally any safety issues related to a trail, but your agency may wish to consult publications that specifically discuss trail design to better assess trail safety issues.

21a. If 21 is yes, note any specific problems with the trail?

Problems with the trail could include security issues, maintenance problems (obstructions to trail, glass and litter), poor lighting or other visibility issues. If you see any of these or additional concerns about the trail, note them on the form.

22. Are the sidewalks at least 5 ft wide?

Although a narrower sidewalk might be very adequate for typical pedestrian use, school children often walk in groups. This can be a particular concern with younger children who can be easily distracted and diverted from the center of the sidewalk. In such situations, a wider sidewalk can greatly improve safety. Photo 22 shows that a 5 ft sidewalk is only just wide enough for even a small group of school children. This sidewalk is impinged upon by tree debris in a number of places, which could divert children into the roadway, although in this case, the grassed buffer strip would likely maintain a good level of safety.

22. 5 ft sidewalk and 3 ft vegetated buffer

Photo by: A. Hartell

23. Is the sidewalk buffered from the road?

A buffer is a linear space provided between the sidewalk and the road to help separate pedestrians from other road users, primarily motor vehicles. Note the presence or absence of a buffer, as well as its width. The form offers three classes of buffer width, measured from the roadside edge of the curb or the outside edge of travel lane if there is no curb. If your agency wants detailed dimensional data, use a measuring tape. Otherwise, simply step off the buffer width; a typical person's stride is between 2 and 3 ft long, but it is a good idea for auditors to verify the length of their stride before going to the field.

There should be a relationship between traffic speeds, volumes, and number of lanes and the width of the buffer. Generally, faster roadways with faster traffic speeds, more lanes, and higher traffic volumes should have wider buffers than narrow, low volume and speed streets. This offers a higher margin of safety for pedestrians through more separation from traffic and generally higher visibility. Photo 23a shows a deep buffer with large trees that offers a safe and pleasant walking environment even along busy roads. Photo 23b shows how curbside parking can effectively buffer the sidewalk from the roadway. This may be more common in urban environments and should be considered a 'buffer' in the audit form. A designated bike lane also offers a buffer between pedestrians and traffic. If the sidewalk is buffered from the road by more than one type of buffer, note all of them in the choice column of the form.

23a. Large vegetated buffer

23b. Curbside parking serves as a buffer

Photo by: www.pedbikeimages.org/Dan Burden Photo by: www.pedbikeimages.org/Dan Burden

24. Are sidewalks continuous and on both sides of the street?

A discontinuity in the sidewalk can pose a safety hazard to children if they are forced to enter the roadway to get past it, or if the discontinuity constitutes a tripping hazard. Photo 24 provides an example of a discontinuous sidewalk. Although it is unlikely to be a pedestrian hazard in dry weather conditions (as photographed), following a rain, standing water could force pedestrians into the roadway. Conditions like this, and their specific location along the segment, should be noted by the auditors in the comment section of Question 24.

24: Discontinuity in sidewalk

Photo by: A. Hartell

25. Is the walking surface adequate and well-maintained?

This question offers the opportunity to note the condition of the walking surface, whether it is a sidewalk, unpaved walkway or walkable shoulder. Although children are generally quite agile, and would not find surfaces in poor condition a substantial safety hazard, broken and missing chunks of sidewalk can constitute a tripping hazard, and broken glass can be dangerous to curious youngsters. Answer this question positively if the walking surface is generally smooth and does not collect substantial nuisance water (even in dry weather, this can be observed by the presence of heavy sediment in depressed areas of the surface). If auditors find problems with the condition of the walking surface, note the specific issue. If in doubt as to whether a surface poses a hazard for students/pedestrians, err on the side of answering this question "no" and documenting the problem. Doing so can provide information that could prevent a small problem from developing into a substantial safety concern if it is not addressed.

26. Is walking surface clear of obstructions?

Obstructions can be a safety issue for pedestrians if they force or encourage pedestrians into a vehicle lane (see Photo 26) Question 26a allows auditors to document the specifics of any obstruction(s) along the segment. Obstructions should be broken into two categories, movable and fixed, as this will allow any problems to be reported to the agency best able to address them. Auditors should also note the location of obstructions in the comments box.

Photo 26: Fence blocking pedestrian passage

Photo by: A. Hartell

26a. If previous is no, note the specific problem.

If you notice sidewalk obstructions in Question 26, note the problems here. The form gives you several possible obstructions to choose from, or mark others that are not listed.

27. Are the conditions at all driveways intersecting the segment such that students/pedestrians are not endangered?

'Blind' driveways pose serious potential safety hazards for children. Auditors should carefully look at all driveways intersecting the pedestrian route and consider whether visibility for drivers or pedestrians is compromised. Keep in mind that drivers may be traveling in reverse as they exit a driveway. In doing this, it is important for auditors to take a 'child's eye' perspective and consider visibility at 3 to 4' heights. In residential neighborhoods, overgrown landscaping is a common problem; in commercial areas, buildings and dumpsters can block driver and/or pedestrian sight lines. Visibility at driveways can also be hampered by parked vehicles. Auditors should note the location and general nature of the problem at any blind driveways. Photo 27a shows how vegetation can block visibility at a driveway. Further, the recycling bin left at the curb requires pedestrians to move further into the traffic lane along this segment as there are no sidewalks or walkable shoulders. Although smaller than the garbage bin in Photo 24, this bin constitutes a functional obstacle for pedestrians while the larger bin, though unsightly, does not. Drivers pulling out of the driveway in Photo 27b must pull onto the sidewalk to see oncoming vehicular traffic. Check "N/A" if there are no driveways intersecting the segment.

27a. Blind driveway from child's eye view

27b. Poor visibility for drivers

Photo by: L. Sandt

Photo by: A. Hartell

28. What are the traffic conditions along the segment?

High traffic speeds and/or volumes not only make the pedestrian environment less attractive, they increase the risk of pedestrian crashes and of serious injury in a crash. As noted for Question 23, the amount and speed of traffic will affect the type of facilities needed for pedestrians. For this question, consider the overall traffic conditions during the time you are assessing the segment.

- Heavy or nonmoving traffic: vehicles move well below the speed limit (at or near gridlock) and allow almost no gap in traffic for pedestrians to cross. If you feel that traffic is very heavy and there is no opportunity to cross the street, check this option.

- Continuous traffic: there is a steady flow of traffic, with only occasional breaks in streams of vehicles, although vehicles can travel at (or close to) the speed limit (see Photo 28a). If you feel you could not safely walk in the walkable shoulder, would have to run to cross the street, or would have to wait a long time to cross, check this option.

- Intermittent or infrequent traffic: traffic volumes range from free-flowing to almost non-existent. Pedestrians can cross the street with minimal or no waiting for a clear gap in traffic. If feel you could safely walk in a walkable shoulder or would have opportunity to cross at any time, check this option (see Photos 28b and 28c). This level of traffic may allow students/pedestrians to safely share the roadway with vehicles.

Appreciable truck volume should be noted when there is a pattern of trucks passing regularly along the segments.

28a. Continuous traffic

28b. Intermittent/infrequent traffic

Photo by: L. Sandt

Photo by: L. Sandt

Photo by: 28c: Intermittent/infrequent traffic

Photo by: L. Sandt

29. Is the segment signed/marked as a 'school zone'?

Signage that is specific to school zones alerts drivers to the presence of school children. This photo shows school zone signage that post a lower speed limit for those times when school children are likely to be present, pavement markings, and yellow school 'pentagon' signs marking a crosswalk ahead. This level of signage will likely only be present on well-traveled roads in close proximity to a school. Note any signage specific to the presence of a school or schoolchildren on the audit form. Only check 'yes' if the segment you are auditing includes school signage.

29. School zone signage

Photo by: L. Sandt

30. What is the posted speed limit (school and regular)?
If there is a speed limit sign along the segment, record the posted limit. If the segment is also signed as a school zone, note the speed limit that applies during school hours/days. If the segment does not have a speed limit sign, mark 'Not Posted' on the audit form.

31. Are posted traffic speeds compatible with student/pedestrian safety needs?
This question allows auditors to report that the posted traffic speed might need to be lower in order to make the segment safer for pedestrians.

32. Is there an opportunity for surveillance that enhances student/pedestrian safety?
Parents often cite serious concerns for the safety of children en route to school in areas where criminal activity would go unnoticed, either because these areas are isolated or are laid out such that the pedestrian route cannot be seen by those inside nearby buildings. Unwatched streets can become places that not only feel abandoned, but can allow for opportunistic crime.

Surveillance can take a number of forms. Informal or 'natural' surveillance is possible when buildings along the route are arranged so windows and porches face the street, increasing the likelihood that any suspicious activity would be seen and reported (see Photos 32a and b). The opportunity for natural surveillance is also increased when the street is actively used by other pedestrians. In contrast, Photo 32c shows a condition does not allow for natural surveillance. More formal arrangements for surveillance can include Neighborhood Watch programs or designated Safe Houses. Auditors should be alert to signs posted along the route, or placards in windows of homes/businesses that indicate that the segment is part of one of these programs.
Walking School Buses are groups organized to walk to school under the supervision of an adult. Only note a Walking School Bus program if it can be observed that a group of pedestrians traveling together is participating in this program. Usually the leaders for these programs wear some sort of reflective or safety gear; participating children may wear reflective sashes as well.

32a. Potential for natural surveillance in a residential setting

32b. Potential for natural surveillance in a commercial setting

Photo by: www.pedbikeimages.org/Dan Burden

Photo by:w.pedbikeimages.org/Dan Burden

32c. No opportunity for surveillance in a commercial setting

Photo by: A. Hartell

32d: Sign indicating Neighborhood Watch

Photo by: A. Hartell

33. Does the social environment contribute to student/pedestrian security?

This question is related to the question on surveillance, although it encompasses a broader range of issues than simply criminal activity. Auditors should note the presence of other types of situations that threaten pedestrian safety. Such conditions can include abandoned buildings, presence of loiterers, or aggressive dogs (see Photo 33). Even if these conditions only constitute a perceived threat, they should be noted in the audit. The way children respond to or avoid such conditions can create a real safety issue. For example, aggressive dogs can frighten children into the traffic lane, or perhaps children may cross the street in a dangerous location to avoid walking close to an abandoned building. Again, it is important to keep in mind a child's perspective. Note the type of problem on the form so that the appropriate enforcement agency can be notified of specific locations and problems.

Photo 33: Abandoned building and street corner frequented by loiterers.

Photo by: A. Hartell

33a. If previous is no, note the specific problem.

If you notice problems with the social environment in Question 33, note the problems here. The form gives you several possible obstructions to choose from, or mark others that are not listed.

34. Are construction zones provided with designated pedestrian detour routes that are separated from traffic and clearly marked/signed?

If there are any construction zones along the segment, auditors should note if the pedestrian route is affected by construction activity. Construction zones can be chaotic and confusing for drivers and pedestrians alike and can increase the chance of a crash. If a sidewalk is closed for construction, a pedestrian detour should be provided that is separated from traffic lanes and is clearly marked (see Photo 34a). Auditors should consider whether children would be able to comprehend the detour signs and follow the detour. Photos 34b and 34c offer examples of construction sites that offer no alternative route for pedestrians, forcing them into the street.

34a. Safe detour for pedestrians at a construction site

Photo by: A. Hartell

34b. Construction zone without pedestrian detour, suburban

Photo by: www.pedbikeimages.org/Dan Burden

34c. Construction zone without pedestrian detour, urban

Photo by: A. Hartell

35. Do at grade RR crossings accommodate students/pedestrians safely?

Pedestrian-train crashes are nearly always fatal, so the potential for such crashes should be investigated. If the segment requires pedestrians to cross a railroad track, auditors should consider the facilities at the crossing. Routes that require pedestrians to scramble over railroad tracks or walk in the traffic lane to get around fencing or other barriers should be noted. Depending on the conditions, auditors might want to note if a railroad track parallels (rather than crosses) the segment if it appears that there are informal footpaths that diverge from the route and cross the tracks. Such situations indicate some deficiency in the connectivity of the pedestrian infrastructure that should be documented and addressed. Photo 35 shows a railroad crossing that safely accommodates pedestrians. It is well-marked with lights and signage, has flush paving for pedestrians (rails at or below walking surface), and a drop arm that also blocks the sidewalk when a train is present.

35: Pedestrian sign at RR crossing

Photo by: L. Sandt

36. Is the lighting adequate along the segment?

Lighting conditions are difficult to assess during a daytime audit. If lighting is a significant concern, you may wish to schedule an evening or early morning field visit. School children may find themselves walking to or from school in the dark, depending on the time of year and latitude. If scheduling a visit outside daylight hours is not feasible, auditors can assess whether the street lights (or exterior lights from businesses and homes) are adequate to ensure visibility. Generally, street lights every 50 ft are adequate, although auditors should consider whether street trees or buildings reduce the amount of light that actually reaches the walking surface.

When you finish completing the form, note the time you ended in the space provided.

INTERPRETING AND USING RESULTS

Filling out the audit forms is only one step in completing the audit. The results of the audit must be used to geographically identify problem areas, rank concerns, and inform a plan of action to develop and implement improvements. This audit is designed so that a quick scan down the "yes" and "no" columns may help you to indicate some problems for the section you audited. Most of the yes answers indicate better pedestrian conditions than the no answers, so look to see if there is a pattern to the categories (e.g., segment vs. crossing or school site) where the "no" responses fall. Also review the "choice" boxes to indicate any potential safety concerns observed and the notes written in the comment boxes. Once you've identified concerns, consider who to talk to about the various issues, for instance the department of public works, the traffic engineering division, or school officials—depending on the type of change needed and the jurisdiction under which it falls.